Strategy of ICP Forests
2007-2015

as adopted at the 23rd Meeting of the Pogramme Task Force
in Zvolen, Slovak Republic, 12 – 16 May 2006

1.   Political background
1.1   Obligation of ICP Forests to CLRTAP

The International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests) has been monitoring forest condition in Europe for 20 years within the Working Group on Effects (WGE) of the Convention on Long-range Transboundary Air Pollution (CLRTAP) under the United Nations Economic Commission for Europe (UNECE). It agreed with the Executive Body (EB) of CLRTAP in 1984 to monitor air pollution effects on forests and to contribute to a better understanding of cause-effect relationships (ECE/EB.AIR/7). The strategy of ICP Forests is based on the long-term strategy (EB.AIR/WG.1/2005/15/Rev.1) and the workplan for the effects-oriented activities (EB.AIR/WG.1/2005/4/Rev.1) of WGE.

1.2   Information needs of WGE

The draft long-term strategy of WGE specifies the following long-term aims to which the ICPs are expected to contribute:

Assessment of knowledge on
- the present status, long-term trends and dynamics, and the degree and geographical extent of the impact of air pollution, particularly, but not exclusively, its long range transboundary impact;
- exposure-response relationships for agreed air pollutants;
- critical loads, levels and limits for agreed air pollutants;
- interactive effects of air pollution and climate change on forest ecosystems

Moreover, the long-term strategy of WGE specifies the following long-term priorities of relevance to ICP Forests:
- derivation of exposure-response functions for chemical and biological effects of air pollutants including investigation of nutrient nitrogen, acidifying compounds and ozone effects on ecosystem functions and on biodiversity, including combinations with other stresses (e.g. climate change and land use practices);
- further development of models and mapping procedures, particularly for effects of nitrogen and ozone on the environment and for the description of dynamic processes of damage and recovery (acidification, eutrophication, heavy metal accumulation) by including to a larger extent biological effects;
- evaluation of environmental benefits of air pollution control policies.

1.3   Information needs of other political processes

The monitoring system and the monitoring data can be used for international processes of environmental policies other than CLRTAP. This applies in particular to the UNECE/FAO Forest Resources Assessment (FRA), to the Ministerial Conference for Protection of Forests in Europe (MCPFE), to the Convention on Biological Diversity (CBD), to the Framework Convention on Climate Change (UNFCCC), and to the European Commission (EC).

2.   Aims of ICP Forests
In order to meet the information needs of WGE, ICP Forests pursues the following two main objectives:

Aim 1:   To provide a periodic overview on the spatial and temporal variation of forest condition in relation to anthropogenic and natural stress factors (in particular air pollution) by means of European-wide and national large-scale representative monitoring on a systematic network.

Aim 2:   To gain a better understanding of the cause-effect relationships between the condition of forest ecosystems and anthropogenic as well as natural stress factors (in particular air pollution) by means of intensive monitoring on a number of selected permanent observation plots spread over Europe and to study the development of important forest ecosystems in Europe.

These aims imply in accordance with the long-term priorities of WGE contributions to calculations of critical loads and levels and the assessment of their exceedances. They imply also dynamic modelling of the response of forest ecosystems to deposition scenarios expected for the future. Additional insight is gained by compiling available studies from the National Focal Centres (NFCs) and from related programmes inside and outside CLRTAP. In this respect close cooperation is sought with the other relevant ICPs under WGE.

3.   Monitoring activities
In order to meet its data generation and reporting obligations, ICP Forests employs data collection at two levels.
   - Large-scale monitoring provides a periodic overview of the spatial and temporal variation in a range of attributes related to forest condition. Up to date, this has been carried out by the Level I network. Level I and NFIs and other related inventory plots may be combined when appropriate, feasible and necessary, according to defined and agreed procedures.
   - Intensive (Level II) monitoring is now carried out on many plots installed in important forest ecosystems. Basic measurements will be continued to support cause-effect studies. In the future, a concept for a sub-sample of these plots, called "core plots", will be developed. These plots will be dedicated to in-depth investigation of the interactive effects of anthropogenic and natural stress factors on the condition of forest ecosystems.

Within its 22 years of existence, ICP Forests established a harmonised forest monitoring system on a pan-European network and created a database permitting evaluations of long-term time series. The infrastructure and expertise of ICP Forests can be used to provide information not only on effects of air pollution on forests but also on climate change and on biodiversity.

4.   Quality assurance and control
All monitoring activities are harmonised by ICP Forests among the participating countries and are laid down in the ICP Forests' "Manual on methods and criteria for harmonised sampling, assessment, monitoring and analysis of the effects of air pollution on forests". This ensures a standard approach for data collection and evaluation and can form the nucleus for a future common European forest monitoring programme. A consistent quality assurance approach is applied within the programme covering the set up of methods, data collection, submission and investigation as well as reporting. Quality assurance and control is supervised by the Programme Coordinating Group through its Quality Assurance Committee. A set of Expert Panels cares for data quality assurance within the specific surveys and for the further development of monitoring methods and standards. This includes field checks, intercalibration courses, laboratory ring tests, and data validation.

5.   Data evaluation and reporting

A range of monitoring parameters are required to meet the information requirements of CLRTAP and other international institutions. The Programme Coordinating Group and the Expert Panels will jointly formulate a data evaluation and reporting approach which takes the medium term workplan of WGE into account. International and national data from other programmes and institutions will be included in a combined analysis. The main topics for data analysis are

- forest condition

effects on forest ecosystems from
- Acidity and nitrogen
- Ozone

contributions in the fields of
- Climate change
- Biodiversity .

The trends in deposition and their interactive effects on the adaptation and vulnerability of forest ecosystems will be evaluated. This includes spatial and temporal changes and cause-effect relationships with special emphasis on critical loads and their exceedances. Dynamic models and transfer functions derived from suitably selected intensive monitoring plots will be used to investigate the effects of climatic factors and greenhouse gases on forest ecosystems and applied to the large scale monitoring plots. These models will be validated against measured data collected at the plots. Furthermore, data gathered at the plots will be used in an integrated manner to investigate the carbon sequestration potential of forests, ozone fluxes to forests and contribute to assess status and trends of forest biodiversity at the pan-European level.

6. Deliverables

The integrated monitoring approach of ICP Forests using the Level I and Level II networks provides robust data on the health and stability of forests. This facilitates an understanding of the effects of deposition on the role and functioning of forest ecosystems in protecting soils and water. Furthermore the programme surveys can contribute to the understanding and forecast of climate change effects on forests and can be used to supply information on the sequestration of carbon and are going to provide information on forest biodiversity as an integral part of forest ecosystems. Results are published via reports and a website (www.icp-forests.org).